

MISSOURI DEPARTMENT OF NATURAL RESOURCES

MTBE Summary of Facts

Fact Sheet

8/2001

Division of Environmental Quality
Division of Geology and Land Survey

What is MTBE?

MTBE stands for Methyl Tertiary Butyl Ether. It is commonly used as a gasoline additive to reduce engine knocks. MTBE is being tested to see if it causes cancer or other health problems. The U. S. Environmental Protection Agency (EPA) is considering outlawing the use of MTBE as a result of the taste and odor problems in water and unreasonable risk to the environment.

What is the concern about MTBE?

It's showing up in groundwater all over the country, and it's tough to clean up.

Why is MTBE still in gasoline?

Gasoline may contain up to 15 percent by volume of MTBE. Higher percentages of MTBE are typically found in premium grades and in reformulated gasoline. Because of its wide use and the need for refiners to change their systems, MTBE cannot be eliminated immediately; however, a phase-out of MTBE that protects consumers without affecting gasoline supplies and costs is under consideration. Such a phase-out should take three to four years.

MTBE and Missouri's water

How does MTBE get into drinking water?

MTBE may enter the water through gasoline spills, gasoline storage tank leaks, or discharges from two-cycle engines on motorboats and other watercraft. It also enters the atmosphere from airborne emissions from vehicles. MTBE travels through groundwater faster than the other components of gasoline. It does not readily break down.

How will I know if I have MTBE in my water?

If you get your water from a public water system, it is routinely tested for MTBE and if any were present your water system officials would notify you. MTBE has a very unpleasant taste and a strong turpentine-like odor. If you are on a private well you would be able to smell or taste MTBE contamination long before it would get to a harmful level. EPA has set an advisory level of 20 to 40 parts per billion (ppb) based on the ability of people with a sensitive sense of smell being able to detect it in this range.

Who watches over my drinking water?

The Missouri Departments of Health and Natural Resources are responsible for protecting the quality of drinking water in Missouri. The Department of Health assists private well owners by offering routine water analyses to all well owners and special analyses on an as-needed basis. The Department of Natural Resources is responsible for making sure that public water supplies are safe. The Department of Natural Resources also regulates well drillers to assure that wells are properly constructed and to protect groundwater quality.



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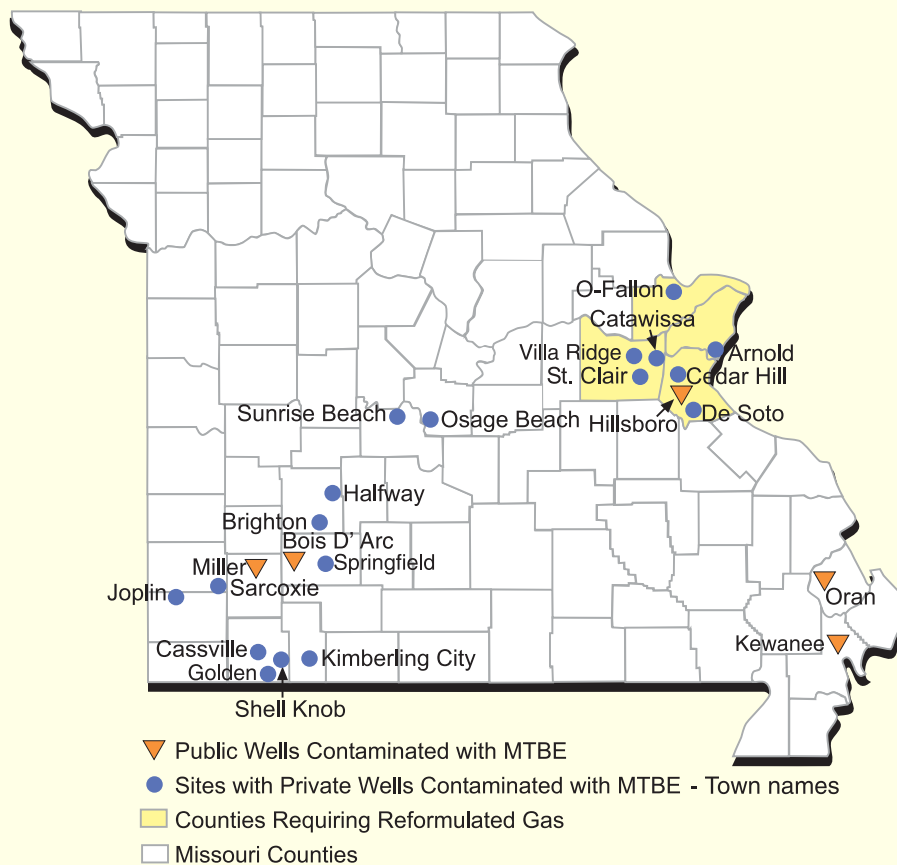
What should I do if I have a private well and suspect that it is contaminated?

For routine water sampling, you should first contact your county health department. If you think that your well is contaminated with MTBE, please call the Missouri Department of Health (Section for Environmental Public Health) at 1-800-392-7245.

What if I get water supplied to me?

The Missouri Department of Natural Resources routinely monitors about 2,000 community public drinking water wells for MTBE and over 100 other potentially harmful compounds at least once every three years. Testing for MTBE began in 1995, so there have been two complete rounds of testing on every public well. The 94 public drinking water systems that use surface water are tested annually for MTBE. Your public water supplier will inform you of any problems.

Wells Contaminated with MTBE (38 total wells at 23 sites)

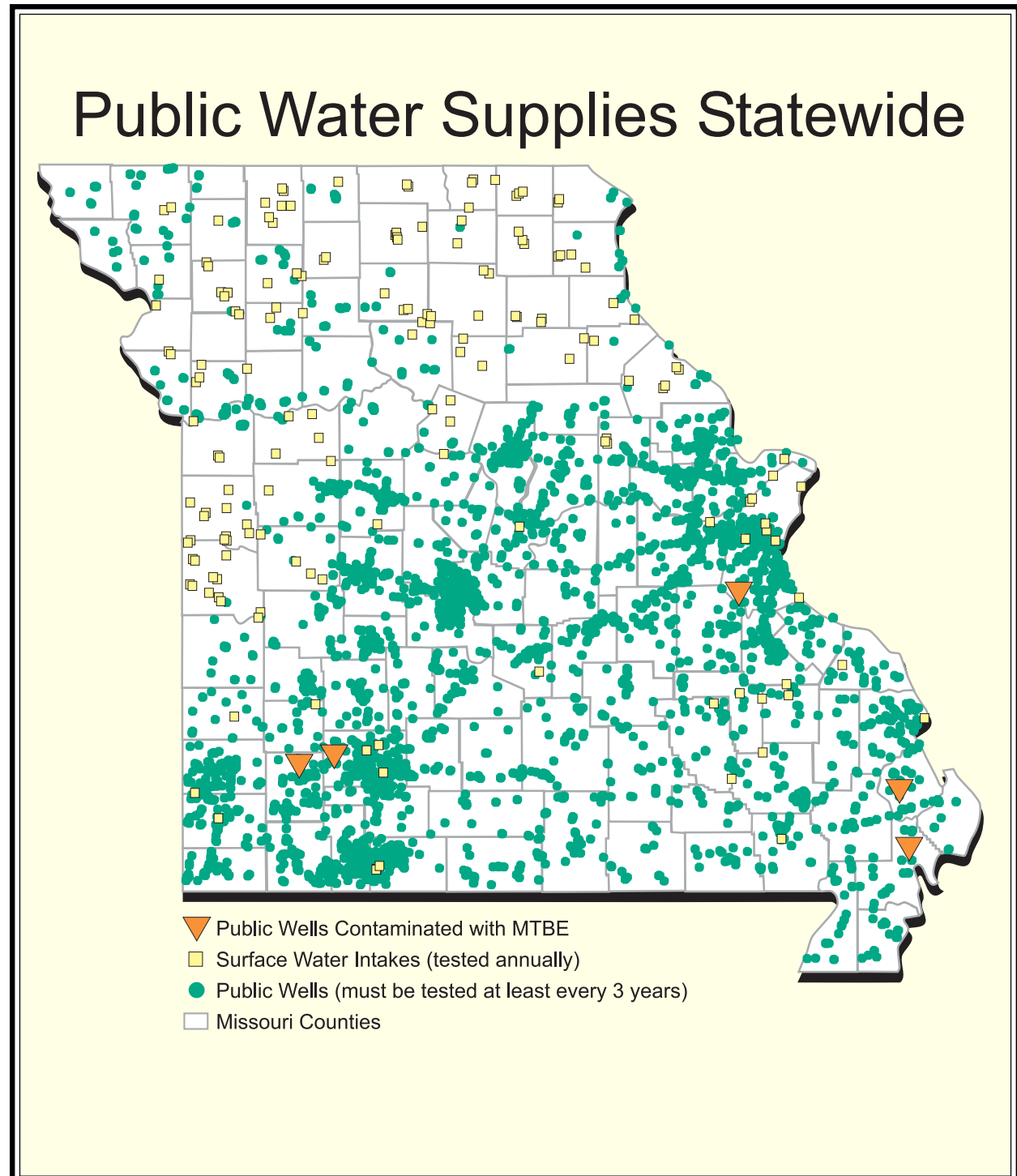


MTBE is a common ingredient in both conventional and reformulated gasoline. Reformulated gasoline is required in the city of St. Louis, Franklin, Jefferson, St. Charles and St. Louis counties. All community and non-transient non-community public water supplies are monitored for MTBE contamination. Six public water supplies have shown trace amounts of MTBE. Twenty-three leaking underground storage tanks sites have contaminated adjacent public or private groundwater wells as of June 2001.

How big of a problem is MTBE in our water?

MTBE has been detected in only six public drinking water wells at five different sites in the time that DNR has been testing.

MTBE has also been found in 32 private drinking water wells, bringing the total number of wells in Missouri contaminated by MTBE to 38 at a total of 23 different sites as of June 2001.



The table below lists all the contaminated sites, the date when MTBE was first detected, and the highest concentration of MTBE measured. Levels higher than about 20 parts per billion (ppb) can cause the water to have a bad taste and smell.

Currently Active Sites Where MTBE has been Detected in a Public or Private Drinking Water Well (The five public sites are shown in shaded cells)					
Name	City	Drinking Water Wells Impacted	Date MTBE first detected	Highest Concentration of MTBE detected (ppb)	How they get their drinking water now
1. Hood's Service Center	Bois D'Arc	1	08/01/00	363	Connected to second well; drilling new drinking water well
2. Oran	Oran	2	04/26/99	74.7	New drinking water well
3. Crossroads Cafe	Miller	1	08/23/00	11.3	Cafe' using contaminated well.
4. Grandview R-2 School	Hillsboro	1	02/17/98	7.9	Connected to high school well
5. New Madrid Public Water Supply Dist. #2	Kewanee	1	10/24/00	12.2	Currently using the well, constructing waterline to hook onto the City of New Madrid.
6. Blue Harbor Marina	Osage Beach	5	09/15/92	17,000	New drinking water wells
7. Ball & Prier	Golden	1	1/19/01	16,700	Bottled water
8. MPC 18	O'Fallon	3	11/17/99	1,870	Connected to Public Water Supply
9. Sinclair Retail #24053	St. Clair	1	07/21/97	1,640	New drinking water well
10. Jefferson Square Standard	Desoto	4	12/27/93	1,200	New drinking water wells
11. Rips' Appliance	Sunrise Beach	2	05/04/93	500	Installed new seal in one well, installed new well at other residence
12. Turtle Cove Subdivision	Kimberling City	1	05/10/99	330	New drinking water well
13. U-Gas Cedar Hill	Cedar Hill	1	04/21/98	141	Water treatment system
14. R&S MiniMart	Catawissa	2	06/17/98	74.2	New drinking water wells
15. Al & Peg's Café	Halfway	1	09/24/92	27	Hooked to the city well
16. Metro Express	Joplin	3	02/04/93	27	Connected to neighbor's water supply
17. Pit Stop / Kopner Well	Arnold	1	02/15/96	24	Alternative water source identified
18. SOS Store	Cassville	1	08/26/93	18	Alternative water source identified
19. Brown's General Express	Brighton	1	12/03/99	12.2	Bottled water
20. Carr Lane Quick Way	Shell Knob	1	12/07/95	12	Charcoal filter provided for well
21. Wood Property	Villa Ridge	2	10/19/00	8.7	Filtration added to well
22. Xpress Truck Stop	Sarcoixie	1	7/28/99	5.9	Water treatment system - filtration
23. Wrinkle Property	Springfield	1	11/20/00	4.3	Well currently in use
23 Total sites	38 wells impacted				

EPA's Water Quality Advisory for MTBE = 20-40 ppb

Well replacement for some of these sites was financed through the Petroleum Storage Tank Insurance Fund.

MTBE Timeline 1979 - 2001

This timeline illustrates the progression of MTBE contamination and regulatory actions from 1979 to 2001. The timeline is represented by a horizontal axis with years from 1979 to 2001. The years 1979 through 1998 are in yellow, while 1999 through 2001 are in red. Various events are marked with colored triangles and labeled with text and site numbers. Blue circles indicate sites with private wells contaminated with MTBE, while orange triangles indicate public wells contaminated with MTBE. Green triangles represent facts on MTBE, and red triangles represent facts on RFG. The timeline shows a significant increase in public well contamination starting in 1998, coinciding with the first round of testing for MTBE in Missouri's public water supply systems. The timeline also shows the implementation of RFG in 1999, which was required to be delivered to eastern Missouri.

1979 - Lead began to be removed from gasoline, related with MTBE

1979

1989

1990

1991

1992

1993

1994

1995

1996

1997

1998

1999

2000

2001

9/82 - Blue Harbor

9/82 - Al & Peg's Cafe

5/83 - Main's Appliances

8/83 - Rip 'n' SOS Store

12/83 - Jefferson Square Standard

12/85 - Carr Lane Quick-Way

2/86 - Pit Stop/Kopner Well

7/87 - Sinclair Retail #240353

2/88 - Grandview R-2 School

4/88 - U-Gas Cedar Hill

5/88 - R & S MiniMart

5/88 - Crum's

5/88 - Turtle Cove Subdivision

11/88 - Yorks Tric Star Shop

12/88 - MFC Brown

6/89 - Proctor's

8/89 - General Express

10/89 - Cal's Property

10/89 - McQuinn Property

11/89 - Ball & Pier

1/91 - Public Water Supply Dist. #2

1992 - DNR begins analysis for MTBE at Leaking Underground Storage Tanks

1995 - Public Water Supply began testing for MTBE

12/97 - First round of testing for MTBE on all Missouri's public water supply systems completed. NO MTBE detected

6/99 - RFG first required to be delivered to eastern Missouri

Public Wells Contaminated with MTBE

Sites with Private Wells contaminated with MTBE

Facts on MTBE

Facts on RFG

No, groundwater moves much more slowly than water in streams, thus many pollution problems aren't found until years after the pollution entered the groundwater. This means that we may find additional sites contaminated with MTBE in the future and it is why DNR will continue to monitor public wells for MTBE.

Most of Missouri's drinking water supplies come from treated surface water. Wells used for public drinking water supplies in Missouri are constructed to the state's highest standards. These wells are typically deeper than private wells and sealed more effectively to prevent near-surface contaminants from entering our drinking water. Private wells drilled since 1987 are also constructed to a higher standard than older wells. Consumers who are drinking water from older, shallow wells or springs located near gasoline storage or transportation systems are at greatest risk.

There are nearly 10,000 underground storage tanks in use in Missouri at just over 4,000 sites. Nearly 25,000 tanks have been permanently closed in the last two decades. Department of Natural Resources goal is to inspect each of the tanks in use approximately once every three years.

What is being done to check on underground tanks?

When a gasoline storage tank leaks, many harmful chemicals can flow into the groundwater. This has led Missouri to require new safety measures and to inspect all tanks. All underground tank operators must monitor their tanks and piping monthly. The records that they keep are reviewed by DNR staff and staff of the Petroleum Storage Tank Insurance Fund. All tanks in use after December 22, 1998 must meet strict design and operating requirements. More than 97 percent of the in-use underground storage tanks have been upgraded in the last 12 years and more than 95 percent of the tanks currently in use have leak detection devices installed.

What about aboveground tanks?

Aboveground tank owners are required to meet safety and fire requirements. This includes having leak and spill prevention equipment. The Missouri Department of Agriculture inspects aboveground fuel storage and dispensing systems. Some of the aboveground tanks are also insured by the Petroleum Storage Tank Insurance Fund, which also makes sure that the owner has a current spill prevention plan.

How is MTBE related to Reformulated Gasoline (RFG)?

MTBE was first used in the United States in the late 1970s to enhance octane as the use of lead in gasoline was discontinued. It helps gasoline burn cleaner and reduces engine “knock” and carbon monoxide and air toxics emissions. This is why it is used in reformulated gasoline. MTBE has been used in the St. Louis area as part of the federal reformulated gasoline program since June 1999. Gasoline with ethanol makes up approximately 40 percent of the reformulated gasoline in the St. Louis area, with gasoline containing MTBE comprising the other 60 percent.

MTBE and Human Health

How much MTBE is bad for me?

EPA sets health-based, legally enforceable drinking water standards called Maximum Contaminant Levels (MCLs) for potential drinking water contaminants. MTBE does not currently have an MCL, but it is on EPA’s list of Unregulated Contaminants and is being considered for regulation in the future. In lieu of an MCL, Missouri’s Department of Health has recommended three action levels for MTBE based on the latest risk assessment information. The first action level is a long-term, or lifetime number, which would be equivalent to an MCL and it is 20 ppb. A second action level, which would be protective of shorter-term exposures, is 400 ppb. This action level is designed to set a limit on the amount of exposure that a community public water supply could receive from MTBE while obtaining an alternate water supply. The third action level is an acute one where the water would not be considered safe to drink, even for a short period of time. The acute action level is 1000 ppb.

It is important to know that MTBE has a strong taste and odor that make it unlikely that you would drink enough MTBE to make yourself seriously ill. EPA’s Human Health and Criteria Division has recommended keeping contamination below the 20 to 40 ppb range to ensure that your water does not have a bad taste and odor. Levels much higher than this advisory range quickly become unacceptable to the public. EPA estimates that concentrations from 20,000 to 100,000 times higher than this are associated with illness or disease in rodent studies.

How much do we know about MTBE's health effects?

Rats and mice have been given MTBE internally and forced to breathe air rich in MTBE. Some of these animals have gotten sick or developed cancers, apparently as a result of their exposure to high concentrations of MTBE. Few tests have been conducted on humans, and none of these studied the effects of drinking MTBE. Because MTBE is mixed with other harmful chemicals, it has been difficult to study its effects on humans. MTBE is thought to cause cancer based on the animal studies, but only at concentrations far above those likely to be found in humans because of MTBE's offensive taste and smell.

How much of a risk is gasoline?

A federal government study concluded that other components of gasoline pose much more serious cancer risks than MTBE. Benzene, a component of all gasoline, is known to cause cancer at levels much lower than the likely exposure of anyone to MTBE. In addition, gasoline contains other compounds known to pose health risks at high concentrations.

If MTBE is bad for humans, why is it still in use?

Much of the information on the health effects of MTBE has only come to light recently. Eliminating MTBE immediately would cause gasoline shortages, higher costs and more air pollution from automobiles. The EPA is considering phasing out MTBE use over the next few years to prevent these possibilities.

What can I do?

Handle all petroleum products carefully and never pour them on the ground. Make sure that your well is properly constructed and never dump anything on the ground near your well. If you are on a public water system, read the annual Consumer Confidence Report that is made available each year describing the quality of your water. If your water smells or tastes of turpentine or has some other unusual smell or taste, contact your local water supplier. For private well owners, please call the Missouri Department of Health at 1-800-392-7245.

Where can I get more information?

For more information on MTBE call or write:
Missouri Department of Natural Resources
Technical Assistance Program
P.O. Box 176, Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 526-6627 office
(573) 526-5808 fax
(www.dnr.state.mo.us/deq/tap) Program Home Page

What programs deal with drinking water quality in Missouri?

DNR – Public Drinking Water Program (www.dnr.state.mo.us/deq/pdwp) – Helps ensure the safety of public drinking water by monitoring for as many as 90 chemicals and bacteria that can cause illness.

DNR – Environmental Services Program (www.dnr.state.mo.us/deq/esp) – Conducts field sampling and laboratory tests on Missouri's water and air. Responds to emergencies involving hazardous chemicals.

DNR – Hazardous Waste - Underground Storage Tanks Section

(www.dnr.state.mo.us/deq/hwp/tanks.htm) – Helps prevent contamination caused by corrosion, leaks, overfilling and spills from underground storage tanks.

DNR – Wellhead Protection Section (www.dnr.state.mo.us/dgls/geosrv/wellhead.htm) - Protects the groundwater from contamination by ensuring that all private wells are built to state standards.

Missouri Department of Health – Section for Environmental Public Health – E-mail them at maleyr1@mail.health.state.mo.us

Missouri Department of Agriculture – Petroleum Quality and Inspection Program

(<http://www.mda.state.mo.us/e.htm>) - Assures that all motor fuels and other fuels meet minimum quality specifications.

Petroleum Storage Tank Insurance Fund – Provides pollution liability insurance to owners and operators of underground and aboveground tanks and pays to clean up old tank sites.

Hotlinks to other information on MTBE	
Site Name	Web address
EPA News Release - Eliminate MTBE	http://yosemite.epa.gov/opa/admpress.nsf/34cef4854b892b8b8525645a004de9a4/2054b28bf155afaa852568a80066c805?OpenDocument
EPA Office of Underground Storage Tanks	www.epa.gov/swerust1/mtbe
EPA Office of Mobile Sources	www.epa.gov/omswww/consumer/fuels/mtbe/mtbe.htm
EPA Office of Groundwater and Drinking Water	www.epa.gov/ogwdw/mtbe.html
EPA Office of Research and Development	www.epa.gov/ncea/oxyneeds.htm
EPA Blue Ribbon Panel (Clean Air Act Advisory Committee Panel on Oxygenate Use in Gasoline)	www.epa.gov/oms/consumer/fuels/oxypanel/blueribb.htm
EPA Integrated Risk Information System	www.epa.gov/iris/subst/0545.htm
U.S. Geological Survey (USGS)	ca.water.usgs.gov/mtbe wwwsd.cr.usgs.gov/nawqa/pubs wwwsd.cr.usgs.gov/nawqa/vocns/mtbe/bib
California Air Resources Board	www.arb.ca.gov/cbg/pub/pub.htm
California Department of Health Services	www.dhs.cahwnet.gov/org/ps/ddwem/chemicals/mtbe/mtbeindex.htm
Lawrence Livermore National Laboratory (Note: Adobe Acrobat Reader needed to view this page)	www-erd.llnl.gov/mtbe/pdf/mtbe.pdf
University of California at Davis	tsrtp.ucdavis.edu/mtbe tsrtp.ucdavis.edu/mtberpt
National Water Research Institute	www.ocwd.com/nwri/mtbe.htm
The Oxygenated Fuels Association	www.ofa.net
American Petroleum Institute	www.api.org/ehs/mtbelink.htm
DOE's Energy Information Administration	www.eid.doe.gov
National Academy of Sciences	www.nas.edu
National Academy Press	www.nap.edu
Petroleum Storage Tank Insurance Fund	www.pstif.org